



# **NAVAL POSTGRADUATE SCHOOL**

**MONTEREY, CALIFORNIA**

## **THESIS**

**IDENTIFYING CAPABILITIES GAPS IN SHIPBOARD  
VISIT, BOARD, SEARCH, SEIZURE (VBSS) TEAMS**

by

Kevin M. Ray

December 2010

Thesis Advisor:  
Second Reader:

Michael E. McCauley  
Ronald D. Fricker

**Approved for public release; distribution is unlimited**

THIS PAGE INTENTIONALLY LEFT BLANK

<b>REPORT DOCUMENTATION PAGE</b>			<i>Form Approved OMB No. 0704-0188</i>	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.				
<b>1. AGENCY USE ONLY (Leave blank)</b>		<b>2. REPORT DATE</b> December 2010	<b>3. REPORT TYPE AND DATES COVERED</b> Master's Thesis	
<b>4. TITLE AND SUBTITLE</b> Identifying Capabilities Gaps in Shipboard Visit, Board, Search, Seizure (VBSS) Teams			<b>5. FUNDING NUMBERS</b>	
<b>6. AUTHOR(S)</b> Kevin M. Ray			<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b>	
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b> Naval Postgraduate School Monterey, CA 93943-5000			<b>10. SPONSORING/MONITORING AGENCY REPORT NUMBER</b>	
<b>9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b> N/A				
<b>11. SUPPLEMENTARY NOTES</b> The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol No: NPS 2010 0035-IR-EP7-A				
<b>12a. DISTRIBUTION / AVAILABILITY STATEMENT</b> Approved for public release; distribution is unlimited			<b>12b. DISTRIBUTION CODE</b> A	
<b>13. ABSTRACT (maximum 200 words)</b> During the past decade, a primary mission for the United States Navy has become Maritime Interception Operations. Many of these operations involve shipboard Visit, Board, Search, Seizure teams. These imbedded teams consist of motivated sailors who go through a specific training pipeline to become a qualified team member. Once these sailors complete their training pipeline, they return to their command and to their normal job. Visit, Board, Search, Seizure becomes a collateral duty that is often neglected until needed. The author conducted a focus group and administered a survey to individuals with Visit, Board, Search, Seizure experience to determine where the current capability gaps lie. The research found that Visit, Board, Search, Seizure teams are well trained, but shipboard manning requirements and Visit, Board, Search, Seizure as a collateral duty inhibit the teams ability to maintain proficiency.				
<b>14. SUBJECT TERMS</b> VBSS, Visit, Board, Search, Seizure, CQB, CQC, Training, Manpower, Navy, Pirates			<b>15. NUMBER OF PAGES</b> 95	
			<b>16. PRICE CODE</b>	
<b>17. SECURITY CLASSIFICATION OF REPORT</b> Unclassified	<b>18. SECURITY CLASSIFICATION OF THIS PAGE</b> Unclassified	<b>19. SECURITY CLASSIFICATION OF ABSTRACT</b> Unclassified	<b>20. LIMITATION OF ABSTRACT</b> UU	

NSN 7540-01-280-5500

Standard Form 298 (Rev. 8-98)  
Prescribed by ANSI Std. Z39.18

THIS PAGE INTENTIONALLY LEFT BLANK

**Approved for public release; distribution is unlimited**

**IDENTIFYING CAPABILITIES GAPS IN SHIPBOARD VISIT, BOARD,  
SEARCH, SEIZURE (VBSS) TEAMS**

Kevin M. Ray  
Lieutenant, United States Navy  
B.S., Texas A&M University, 2004

Submitted in partial fulfillment of the  
requirements for the degree of

**MASTER OF SCIENCE IN HUMAN SYSTEMS INTEGRATION**

from the

**NAVAL POSTGRADUATE SCHOOL  
December 2010**

Author: Kevin M. Ray

Approved by: Michael E. McCauley, PhD  
Thesis Advisor

Ronald D. Fricker, Jr., PhD  
Second Reader

Robert F. Dell, PhD  
Chairman, Department of Operations Research

THIS PAGE INTENTIONALLY LEFT BLANK

## **ABSTRACT**

During the past decade, a primary mission for the United States Navy has become Maritime Interception Operations. Many of these operations involve shipboard Visit, Board, Search, Seizure teams. These imbedded teams consist of motivated sailors who go through a specific training pipeline to become a qualified team member. Once these sailors complete the training pipeline, they return to their commands and to their normal jobs. Visit, Board, Search, Seizure becomes a collateral duty that is often neglected until needed. The author conducted a focus group and administered a survey to individuals with Visit, Board, Search, Seizure experience to determine where the current capability gaps lie. The research found that Visit, Board, Search, Seizure teams are well trained, but shipboard manning requirements and Visit, Board, Search, Seizure as a collateral duty inhibit the teams ability to maintain proficiency.

THIS PAGE INTENTIONALLY LEFT BLANK

# TABLE OF CONTENTS

<b>I.</b>	<b>INTRODUCTION.....</b>	<b>1</b>
<b>A.</b>	<b>MOTIVATION.....</b>	<b>1</b>
<b>B.</b>	<b>RESEARCH OBJECTIVES.....</b>	<b>3</b>
<b>C.</b>	<b>METHODOLOGY.....</b>	<b>3</b>
1.	Background Study.....	3
2.	Focus Groups.....	3
3.	Survey.....	4
<b>D.</b>	<b>ORGANIZATION OF THE THESIS.....</b>	<b>4</b>
<b>II.</b>	<b>LITERATURE REVIEW.....</b>	<b>5</b>
<b>A.</b>	<b>INTRODUCTION.....</b>	<b>5</b>
<b>B.</b>	<b>TRAINING.....</b>	<b>6</b>
1.	The Military Can Utilize the Civilian Sector.....	6
2.	Games Can Benefit the Individual Warfighter.....	8
3.	Marksmanship Simulators.....	8
4.	Training Transfer.....	10
<b>C.</b>	<b>MANPOWER.....</b>	<b>11</b>
1.	Increased Risk with Reduced Manning.....	12
2.	Navy Standard Workweek.....	12
3.	Fatigue.....	13
<b>D.</b>	<b>SAFETY.....</b>	<b>13</b>
1.	Previous Incidents.....	14
2.	Operational Risk Management.....	16
<b>E.</b>	<b>HOW OTHERS OPERATE.....</b>	<b>18</b>
1.	Boarding Officer Qualification Support Program (BOQSP).....	19
2.	Marine Patrol Officer Course–Tactical (MPOC-T).....	21
3.	U.S. Coast Guard Basic Boarding Officer Course (BOC)...	22
4.	U.S. Coast Guard Boarding Team Member Course (BTM).....	24
5.	U.S. Coast Guard Radiation Detection Level II Operators Course (RADHAZ).....	24
<b>III.</b>	<b>METHODS.....</b>	<b>27</b>
<b>A.</b>	<b>FOCUS GROUP ADMINISTRATION.....</b>	<b>27</b>
<b>B.</b>	<b>SURVEY ADMINISTRATION.....</b>	<b>28</b>
<b>IV.</b>	<b>RESULTS.....</b>	<b>31</b>
<b>A.</b>	<b>FOCUS GROUP ANALYSIS.....</b>	<b>31</b>
1.	Materiel Issues.....	31
2.	Manpower/Personnel Issues.....	32
3.	Training Issues.....	32
<b>B.</b>	<b>SURVEY ANALYSIS.....</b>	<b>33</b>
1.	Manning.....	34
2.	Training.....	37

3.	Deployment .....	39
4.	Summary .....	40
V.	CONCLUSION AND RECOMMENDATIONS .....	43
A.	CONCLUSION .....	43
B.	RECOMMENDATIONS .....	43
1.	Embarked Units .....	43
2.	Deployable Mission Trainer .....	45
3.	Summary .....	46
C.	FUTURE RESEARCH.....	47
1.	MIO Commander Training.....	47
2.	Equipment .....	48
3.	Summary .....	49
	APPENDIX A. REQUEST FOR VOLUNTEERS (FOCUS GROUP).....	51
	APPENDIX B. INFORMED CONSENT (FOCUS GROUP) .....	53
	APPENDIX C. INFORMED CONSENT (SURVEY) .....	55
	APPENDIX D. SURVEY QUESTIONS .....	57
	APPENDIX E. LETTER TO COMMANDING OFFICERS.....	61
	APPENDIX F. REQUEST FOR VOLUNTEERS (SURVEY) .....	63
	APPENDIX G. RESPONSES TO THE SURVEY OPEN ENDED QUESTIONS .....	65
	LIST OF REFERENCES.....	71
	INITIAL DISTRIBUTION LIST .....	75

## LIST OF FIGURES

Figure 1.	U.S. Marine Using an ISMT Trainer (From U.S. Marine Corps, Public Affairs, 2010) .....	9
-----------	--	---

THIS PAGE INTENTIONALLY LEFT BLANK

## LIST OF TABLES

Table 1.	Risk Assessment Matrix .....	18
Table 2.	Question 2 Results .....	35
Table 3.	Question 3 Results .....	35
Table 4.	Question 8 Results .....	36
Table 5.	Question 9 Results .....	37
Table 6.	Question 10 Results .....	37
Table 7.	Question 5 Results .....	38
Table 8.	Question 6 Results .....	38
Table 9.	Question 7 Results .....	38
Table 10.	Question 13 Results .....	39
Table 11.	Question 12 Results .....	40

THIS PAGE INTENTIONALLY LEFT BLANK

## LIST OF ABBREVIATIONS AND ACRONYMS

AAR .....	After Action Report
AAV.....	Approach, Assist, Visit
ADT.....	Active Duty for Training
AEL .....	Authorized Equipment List
AI .....	Artificial Intelligence
BOC.....	Boarding Officer Course
BOPC.....	Boarding Officer Practical Course
BOQSP .....	Boarding Officer Qualification Support Program
BRF.....	Backup Reaction Force
BTM .....	Boarding Team Member
BUI.....	Boating under the Influence
CG .....	Guided Missile Cruiser
CO .....	Commanding Officer
CPRL .....	Contingency Personnel Requirements Lists
DAG .....	Defense Acquisition Guidebook
DDG.....	Guided Missile Destroyer
FATS.....	Fire Arms Training Simulator
FFG.....	Guided Missile Frigate
HSI.....	Human Systems Integration
HVBSS.....	Helo-borne Visit, Board, Search, Seizure
Identifinder .....	<i>see RIID</i>
IDT .....	Inactive Duty for Training
IET .....	Information Exploitation Team
ISMT .....	Indoor Simulated Marksmanship Trainer
ISMT-E.....	Indoor Simulated Marksmanship Trainer-Enhanced
LE .....	Law Enforcement
LPD.....	Amphibious Transport Dock
LSD.....	Dock Landing Ship
MEU.....	Marine Expeditionary Unit

MEUSOC .....	Marine Expeditionary Unit Special Operations Command
MIO .....	Maritime Interdiction Operations
MLE .....	Maritime Law Enforcement
MOVES.....	Modeling, Virtual Environments, and Simulation
MPOC-T.....	Marine Patrol Officer Course - Tactical
NATO.....	North Atlantic Treaty Organization
NEIC .....	Navy Expeditionary Intelligence Command
NPS .....	Naval Postgraduate School
NTTP .....	Navy Tactical Training Publication
OIC .....	Officer in Charge
OJT .....	On-the-Job Training
OPTEMPO.....	Operational Tempo
PRD .....	Personal Radiation Detector
PT .....	Physical Training
PQS .....	Personnel Qualification Standards
PWC .....	Personal Watercraft
RadPack .....	Radiation Detection Backpack
RADHAZ .....	Radiation Detection Level II Operators Course
RadPager.....	see <i>PRD</i>
RHIB .....	Rubber Hull Inflatable Boat
RIID.....	Radioisotope Identification Device
SELRES.....	Selected Reserves
SRF.....	Shipboard Reaction Force
USCG .....	United States Coast Guard
USMC .....	United States Marine Corps
USN .....	United States Navy
VBSS .....	Visit, Board, Search, Seizure
VBS.....	Virtual Battlespace
XO.....	Executive Officer

## **EXECUTIVE SUMMARY**

The majority of United States Navy Visit, Board, Search, Seizure (VBSS) operations are conducted utilizing embedded shipboard teams. To become a team member, individuals must meet physical standards, weapons qualifications, and attend three courses that total eight weeks. Once qualified, these boarding team members can board noncompliant vessels that have a low freeboard.

This thesis seeks to identify current capabilities gaps in shipboard VBSS, specifically in the Human Systems Integration (HSI) domains of Training, Manpower, and Safety. To identify potential gaps, seven qualified VBSS team members participated in a focus group conducted at the Naval Postgraduate School (NPS). Additionally, a survey was fielded to the VBSS team members aboard five randomly selected U.S. Navy vessels.

The research findings indicate that there are potential capabilities gaps within shipboard VBSS teams, specifically, in the training and manpower domains of HSI. Of the respondents, only 20 percent answered that they train more than once a week while underway. When these vessels are inport, the participants who train more than once a week decreased to only 5 percent. Furthermore, only 5 percent stated that the underway watchbills allow them to participate in the majority of their training opportunities.

THIS PAGE INTENTIONALLY LEFT BLANK

## **ACKNOWLEDGMENTS**

First and foremost, I would like to thank God for the blessings that he has brought into my life. Without him, I would not be where I am today. He has given me the ability to persevere while maintaining a positive outlook. Another important thank you goes to my beautiful wife, Miranda, and our three children, Aubrey, Addison, and Alexa. Without their support and dedication, life would be much more challenging and less enjoyable.

Next, I would like to thank Dr. McCauley and Dr. Fricker. From day one, you both supported my ideas and approach for completing this thesis. I truly appreciate your recommendations, guidance, and patience. You both helped to make this process as seamless as possible.

Lastly, a large thank you goes to all who participated in my thesis process. Participants include my colleagues who reviewed the survey questions, the officers who volunteered for the focus group, the Commanding Officers who granted their approval for allowing me to survey their VBSS teams, and the VBSS Team Members who answered the survey. I appreciate your assistance and wish you all fair winds and following seas.

THIS PAGE INTENTIONALLY LEFT BLANK

# **I. INTRODUCTION**

## **A. MOTIVATION**

In May 2007, the author reported onboard USS San Antonio (LPD 17) as a second tour division officer. During his tour, he was tasked with building the onboard Visit, Board, Search, Seizure (VBSS) team from the ground up. VBSS teams consist of approximately 21 sailors who are trained in noncompliant boarding procedures. It is their mission to board a suspect vessel to verify documentation and cargo. During the process of building his ship's team, the author spoke with multiple boarding officers from other vessels to acquire best practices from around the fleet. During this process, he realized that there was wide variation in VBSS procedures and operations. It appeared that each ship had completed a different training pipeline during its qualification process, and many of these teams mentioned that they do not conduct routine training. This variability and lack of follow-on training was surprising because each team member was required to meet the same prerequisites and had attended the same schools before joining his or her respective shipboard team. Upon a closer inspection, the author became concerned that these teams were not as prepared as they should have been, given the dangerous nature of VBSS.

The prerequisites and training that are required to be a VBSS team member are as follows:

- A good medium or higher in **each** category of the Physical Readiness Test (PRT)
- Weapons qualification with the M-9 service pistol, M-16 service rifle, and 500 mm shotgun.
- Second class swim qualification completed within the last 12 months.
- Completion of a 30-foot Jacob's ladder climb in full gear.

- Completion of the Ships Reaction Force Basic course (including the Nonlethal Weapons portion)
- Completion of the Ships Reaction Force Advanced course
- Completion of the VBSS Team Trainer course

Additionally, VBSS boarding officers and breachers must complete additional courses/requirements.

Although these courses are robust, especially the VBSS Team Trainer course and the breacher course, they do not prepare the student for all aspects of the Maritime Interception Operations (MIO) mission. Detainee handling, compliant boardings, and Approach, Assist, Visits (AAVs) are left for the individual commands to focus on and continue to train to. The only time that they are addressed before deployment is during the training cycle. During this time, there are a few opportunities for the ships to be evaluated while conducting MIO missions. The evaluations do a good job at showing a ship where its weaknesses are in regards to these missions; however, these evaluations often turn into training sessions wherein the boarding team receives further training in correctly conducting business during the given scenarios.

Once a ship completes the training cycle, there are several factors that determine how well prepared a vessel's VBSS team is during its deployment. These factors include command support, underway training, inport training, training capabilities, and other missions that the ship is tasked with. Although command support and other tasking can greatly affect the amount of training that the VBSS team is able to conduct, they are out of the lead boarding officer's control. To ensure that his team is able to safely complete any MIO mission that may occur during the deployment, the boarding officer must focus on the quality of training that his team receives—both inport and underway. One objective of this study was to determine whether a capability gap lies within VBSS training, and whether the United States Navy is handicapping the deployed units that are in harms way.

## **B. RESEARCH OBJECTIVES**

This thesis focuses on the following objectives:

Primary Objective:

- Identify potential capability or readiness gaps in shipboard VBSS operations.

Secondary Objective:

- Identify potential ways to close the capability (e.g., changing manpower requirements, training systems, policy changes)

## **C. METHODOLOGY**

### **1. Background Study**

The author started the project by investigating how other services tackled the problem of close quarter battle (CQB) training, especially in a deployed status. He conducted a literature review that focused on three major topic areas: reduced manning effects on team training within the Navy, CQB training throughout the world's military forces, and the historical use of games for training and training transfer of simulation-based training. This research provided a solid foundation and starting point for the thesis.

### **2. Focus Groups**

The primary purpose of the focus group was to determine whether other service members with VBSS experience felt that the current program contained capability gaps. Additionally, if the focus group established that there were capability gaps, they identified other factors that may have contributed to the perceived gaps.

### **3. Survey**

The author developed a survey consisting of 17 questions, tailored specifically for the research objectives of this thesis. The purpose of this survey was to utilize current VBSS Team Members to identify whether or not there are capabilities gaps within VBSS, isolate where the gaps may lie, determine how significant the gaps actually are, and identify possible solutions.

## **D. ORGANIZATION OF THE THESIS**

The organization of this thesis is as follows:

- I. Introduction: This chapter discusses the motivation behind the author's selection of the topic. Additionally, it provides the objectives and methodology of the research.
- II. Literature Review: This chapter provides the background for the thesis topic. In this chapter, the author utilizes existing research to show the importance of the HSI domains of Training, Manpower, and Safety within the VBSS mission set.
- III. Methodology This chapter describes the administration of the focus group and survey.
- IV. Results: This chapter discusses the data that was collected from the focus group and survey.
- V. Conclusions and Recommendations: The final chapter discusses areas of interest within the VBSS mission set that could benefit from further research.

## **II. LITERATURE REVIEW**

### **A. INTRODUCTION**

When average U.S. citizens think about U.S. Navy warships, they imagine large gray vessels that are capable of launching and recovering aircraft at sea, shooting down airborne threats, and softening a beach prior to a Marine Corps landing. However, since the end of the Cold War, the mission of the U.S. Navy has greatly expanded into what is known as MIO.

MIO was developed to utilize Navy assets to enforce United Nations (UN) sanctions on countries that may attempt to smuggle in/out weapons, drugs, and people. These missions include querying vessels, boarding vessels, and detaining the personnel and vessel when needed. Previously, when a vessel needed to be boarded due to contraband or a suspected high-value target on board, the U.S. Navy Special Forces were tasked with carrying out the mission. However, now that the Navy is trying to take a more proactive stance on illegal maritime operations, more vessels are being queried and boarded; the majority of which are operating legally. These operations aid the coalition by not only showing the terrorists and smugglers that the seas are being patrolled, but they also allow our units to build relations with local mariners that may provide important information or intelligence on illegal activity in the region.

With the Navy shifting its focus at sea to MIO, the Special Forces are not able to board every vessel of interest. This is largely due to an insufficient number of Special Forces units available. Instead, the U.S. Navy expanded boarding capabilities to its surface fleet by training highly motivated sailors to perform the required tasks. Initially, these boarding teams were poorly equipped and lacked proper training for the job, especially if the boarded vessel were to become noncompliant (Mullin & Bartee, 2002). Between 2004 and 2005, U.S. boarding capabilities took a leap forward with the design and development of the Noncompliant VBSS Team Trainer course. This course is the capstone

requirement for candidates to become VBSS team members and encompasses tactical team movements, hand to hand combat, and combat medical training (NTTP 3-07.11).

## **B. TRAINING**

Training aids have been, and continue to be, utilized over a wide spectrum of professions. Football players use tackling dummies while medical students use cadavers, animals, and artificial body parts. The military is no different. Much like these other organizations, the military has been constantly evolving techniques and technologies to train its personnel. The remainder of this section will focus on close quarters combat (CQC). To support VBSS training, or CQC, houses and ships have been constructed utilizing shipping containers, plywood, or any other available materiel. Some training locations have gone to great lengths to ensure that once the trainees enter the facilities, it is as though they are in the live environment of a deployed combat zone. Additionally, the training weapons have evolved from simple plastic rifles and pistols to military weapons that are modified to fire paint bullets from live casings.

These training aids provide our military with a great advantage in knowledge, skills, and mindset. The problem that persists, however, is that these advanced training aids are not deployable, can be expensive to construct/maintain, or can only be utilized by a small number of personnel at a given time. Due to these reasons, the U.S. Army and Marine Corps have started to look into military training games, coined “serious” games by Ben Sawyer, as the new deployable training aid of choice (Macedonia, 2005).

### **1. The Military Can Utilize the Civilian Sector**

Over the course of the last two decades, the civilian market has pushed the envelope in regards to the development of realistic virtual environments and game technology. The advances in realism, efficiency, and usability are largely due to the increase in software and hardware technology, which has lowered the cost of computers and components while increasing their capabilities. The result

of the advancements in hardware and software capabilities is the increased quality and authenticity of the developed virtual reality representations. Many civilian video game programmers and developers strive to produce the most realistic gaming environment that current technology allows. The products of these endeavors are video games such as *Operation Flashpoint: Cold War Crisis*, *Full Spectrum Warrior*, and *Call of Duty: Modern Warfare*. While the civilian sector has been greatly improving their tactical video games, the military has attempted to use the technology as a training aid.

In 1994, id Software released *Doom II*, a sequel to its landmark 1993 video game *Doom*. While this game was winning civilian video game awards, a couple of Marines were making military history. These Marines, through searching and analyzing multiple civilian video games, had found that id Software had released a portion of the game on shareware and allowed gamers to make modifications. This capability enabled Sergeant Daniel Snyder to modify the skins, or graphics, that were on the players and weapons (Jernigan, 1997). What these motivated Marines had accomplished was a video game utilized as a military trainer that could be installed on any computer, whether deployed or not (Riddell, 1997). Though this game would become popular within the Marine Corps for a few years, the technology would quickly advance and leave this training aid in the past.

The latest iteration of the military utilizing the civilian sector's advancements and achievements in gaming technology is with Virtual BattleSpace (VBS) 2. As before, the Marine Corps took the initiative, and looked for a civilian video game that could be modified to work as a team trainer. Their research led to a deal with Bohemia Interactive, an Australian company that produced *Operation Flashpoint: Cold War Crisis*. The finished product was a modified version of *Operation Flashpoint* that allowed the Marine Corps the ability to easily edit the gaming environment. This capability allowed the Marine Corps to quickly and almost effortlessly create a large number of realistic scenarios on various terrains that could be used to train multiple Marines at one

time over a network of computers (Brown, 2010). As research continues to be conducted by the Marine Corps to verify the effectiveness of “serious” games as an effective training aid, the U.S. Army has contracted Bohemia Interactive to provide VBS 2 for Army training.

## **2. Games Can Benefit the Individual Warfighter**

Creating an environment that allows the individual warfighter to simulate a tactical scenario can be difficult. Previously, the Marine Corps has utilized sketches and two-dimensional graphics to allow personnel to think through a static military situation (Brown, 2010). Though these techniques have worked well in the past, they do not utilize the technology that is available today that can enhance the learning environment of the trainee.

The “First Person Shooter” genre of video games allows users to immerse themselves in the virtual environment and play the role of their electronic character by seeing the “world” from that character’s viewpoint. This approach allows for a fast paced, realistic, three-dimensional experience for the user (Barlow, Morrison, & Easton, 2002). Another benefit of first person shooter games is that they can create realistic enemies, civilians, and friendly forces that can add to the user’s experience and allow for a variety of training scenarios. Additionally, the software code can be written to allow the administrator to review the scenario and how the user performed, further increasing the effectiveness of the training. An example is the After Action Review (AAR) feature within VBS 2, which allows the scenario to be reviewed from a first person or third person point of view (Brown, 2010).

## **3. Marksmanship Simulators**

Simulator-based training is another effective method for conducting training while saving an organization money. The aviation community is a prime example of how successful simulation-based training can be. Pilots can practice taking off and landing from any location and with nearly any aircraft platform in the world, all while never leaving a small building. The utilization of simulator-

based training also has proven effective for marksmanship training. For this reason, it is widely used across the United States Armed Services.

The United States Marine Corps prides itself on the slogan “every marine is a rifleman.” For this reason, the author researched the use of marksmanship simulators in the Marine Corps. More importantly, he examined studies that have been conducted to determine the effectiveness of these simulators in comparison to live fire training.



Figure 1. U.S. Marine Using an ISMT Trainer (From U.S. Marine Corps, Public Affairs, 2010)

In 2004, Major William Yates conducted research on the effectiveness of training transfer when utilizing the Indoor Simulated Marksmanship Trainer (ISMT). He had noticed that the culture within the Marine Corps had shifted to rely on virtual environment trainers for both initial skill acquisition and follow-on sustainment training. During his study, he conducted an experiment that compared the results of a live fire control group against a test group that was using the ISMT. The two groups were comprised of new recruits who were participating in Marine Corps recruit training. The M16A2 was the weapon utilized by both groups during the experiment. The resulting data of Major Yates' experiment did not show a significant difference in performance between the two

groups (Yates, 2004). This finding suggests that quality marksmanship trainers, like the ISMT, may be a good alternative when live fire weapon training is not feasible.

#### **4. Training Transfer**

Conducting training, regardless of media, is useless if the trainee's performance on the job is not improved. The change in the trainee's performance in the operational environment, or the quality of transfer, is ultimately what determines if training is effective or not. For the purposes of this paper, we will define training transfer as "the extent of retention and application of knowledge, skills, and attitudes from the training environment to the workplace environment" (Bossard, Kermarrec, Buche, & Tisseau, 2008). It is not easy to evaluate training effectiveness and transfer.

When evaluating serious games, training transfer can occur on many different levels. Within this virtual environment, you have vertical transfer and horizontal transfer. Major Ben Brown (2010) stated the following:

Vertical transfer refers to the ability of the learner to recognize elements of the training context and apply what he or she has learned to problems of increasing complexity. Horizontal transfer, on the other hand, describes the learner's application of knowledge and skills gained through the training to general problems that extend beyond the immediate context of what was taught. (p.37)

To ensure that training transfer occurs, and to increase the quality of the training, it is critical that the training remains consistent with the training objectives (Bossard et al., 2008).

Humans are complex and contribute to the challenge of the quality and effectiveness of training. Training that is highly effective for one individual may be useless for another. To increase the odds that a positive transfer of training occurs, the selected media for the training method must match the trainee. Matching the media with the trainee can be difficult because people come into the training with different experiences. For example, individuals born in the 1960s

fix all may not experience as high of a transfer of training when utilizing a serious game as the training media, while an individual born in 1990 may greatly benefit from this training method. This difference in training transfer could be due to a number of reasons. The older individual did not grow up using a computer, while the individual born in 1990 was likely to have used one on a daily basis, starting in elementary school. In addition, once the individuals sat down to begin their training; the older individual may have experienced a higher level of anxiety due to not being comfortable with computer media. Trainees can be prescreened to minimize these effects and improve the odds that the training method matches that of the individuals being trained, though this may not always be possible in the military due to the large numbers that have to be trained (Burke & Hutchins, 2007).

Once the trainer has selected the most effective method, he must have a way to measure, or grade, the trainees' ability to perform the task and be able to review the training session once it is complete. The U.S. Navy's Conning Officer Virtual Environment (COVE) training, given at Surface Warfare Officer School (SWOS) in Newport, Rhode Island, is a great example of reviewing the training session with the learner. Once the training is complete, the instructor is able to show trainees exactly how they performed and what mistakes they made by displaying their AARs on the computer screen. Reviewing the trainee's mistakes can increase training transfer (Bossard et al., 2008).

### **C. MANPOWER**

According to the Defense Acquisition Guidebook (2008), or DAG, manpower factors are defined as:

Those job tasks, operation/maintenance rates, associated workload, and operational conditions (e.g., risk of hostile fire) that are used to determine the number and mix of military and Department of Defense (DoD) civilian manpower and contract support necessary to operate, maintain, support, and provide training for the system. (p. 4)

In addition, the DAG (2008) states that manpower studies and analysis serve as the basis for manpower goals and parameters for systems. The U.S. Navy is striving to decrease its manning to the fewest number that are required to operate, maintain, train, and support its fleet, also known as “optimal manning” (Russell, 2006). This initiative is being driven by a decreasing budget, of which the personnel account more than half of the operations and support costs for each Navy vessel (Hinkle & Glover, 2004).

### **1. Increased Risk with Reduced Manning**

Regardless of the number of personnel that are onboard, the vessel must be able to complete its mission(s) while being able to defend itself against enemies, fire, and flooding. When in a situation that requires additional manpower, a ship will operate in either a Condition I or Condition II watchbill status. Condition II is generally for fighting fires or flooding when an enemy combatant is not in the vicinity. This watchbill increases the number of personnel who are on watch, but places them in damage control stations, allowing the ship to fight the fire or flooding for an extended period of time, if need be. Condition I, however, is only intended for short durations because it places shipboard personnel at all of the damage control and weapon stations to effectively fight the ship and any damage that may occur during an enemy attack. With a reduction in manpower, the role of each individual onboard is greatly increased. Additionally, “optimally” manned vessels may not be able to rely on their increased amount of automation due to a loss of power, which could easily be caused by fire or flooding (Russell, 2006).

### **2. Navy Standard Workweek**

The Navy Standard Workweek is the official guidance that directs the number of hours an enlisted sailor should work per week while the ship is underway (OPNAV INST 1000.16K). Additionally, the Navy utilizes the standard workweek to determine the number of personnel required to man naval vessels. The workweek is broken into two categories: Available Time (81 hours allotted)

and NonAvailable Time (87 hours allotted), and is based on the expected wartime conditions with the unit in Condition III, normal underway steaming. The sailors' available time includes watch standing, maintenance, training, and meetings. Currently, the Navy Standard Workweek allots sailors seven hours of training a week, but this number will likely increase as manpower is reduced, due to an increase in responsibilities and collateral duties of each sailor onboard (Haynes, 2007).

### **3. Fatigue**

Fatigue, defined as "weariness or exhaustion from labor, exertion, or stress" ("Fatigue," 2007), is becoming a highly researched topic within the military, especially in the Navy's Surface Warfare community. It has been shown that fatigue can be brought on by lack of sleep, the time of day/night, inadequate nutrition, environmental conditions, as well as many other factors in an individual's daily routine (Chapman, 2001).

As individuals become fatigued, they are more likely to lose concentration, have slower response times, and have poor judgment (*Fatigue Management Guide*, 2005). Fatigue also causes an increase in the number of times individuals blink their eyes, the duration of their eye closures, and small bursts of sleep known to many as "touch and goes," but technically titled "microsleep" (Wickens, Lee, Liu, & Becker, 2004). These various effects of fatigue are dangerous for motor-vehicle operators, but they are common practice for personnel operating a warship under the current manning conditions. Even more dangerous is sending a team of VBSS members to conduct a boarding on a potentially dangerous vessel while they are suffering from fatigue.

### **D. SAFETY**

Safety is a key concern for a VBSS team. First, to completely understand safety and ensure that everyone is in accord, we must define it. According to chapter six of the DAG, "safety factors consist of those system design characteristics that serve to minimize the potential for mishaps causing death or

injury to operators and maintainers or threaten the survival and/or operation of the system” (DAG, 2008). In the case of a VBSS team, the “system” includes all of the team members, their equipment, the boat crew, the small boat used for transporting the team, and all supporting personnel and equipment onboard the ship from which the VBSS team is deployed (including the ship itself).

## **1. Previous Incidents**

Going alongside a foreign vessel, whether conducting a full boarding or simply an Approach, Assist, Visit (AAV), is inherently dangerous. On 24 April 2004, USS Firebolt (PC 10) was operating in the Northern Arabian Gulf (NAG) in support of Operation IRAQI FREEDOM (OIF). Its Rigid Hull Inflatable Boat (RHIB) was deployed with the boat crew and four VBSS team members on board. When making approaches to fishing dhows that were operating in the restricted waters around the Iraqi oil terminals, one vessel abruptly maneuvered towards the RHIB and exploded. This explosion killed three of the team members and inflicted serious injuries on the remaining survivors in the RHIB (Olson, 2004).

USS Gonzalez (DDG 66) experienced a similar, but fortunately not as lethal, attack on 18 March 2006 while operating off the coast of Somalia. This area is a known “hot spot” for piracy, and Gonzalez and USS Cape St. George (CG 71) were working together in the region when they spotted two skiffs in tow behind a larger vessel. This configuration is a common indicator of pirate activity, so the crew of DDG 66 immediately took action in stepping through their procedures for querying and boarding the vessel of interest. As their boarding team approached the vessel, the pirates engaged the RHIBs with small-arms fire. The RHIBs immediately backed out, while the boarding team returned fire, utilizing their small arms. Additionally, both Gonzalez and Cape St. George engaged with their respective .50-caliber machine guns. During the engagement, the RHIBs with the boarding party were able to safely extract to the nonengaged side of Gonzalez. Additionally, rounds fired from Gonzalez ignited a 55-gallon

fuel drum aboard the larger pirated vessel, causing explosions and black smoke to billow from the vessel. During this short engagement, the U.S. Navy killed one Somali pirate and wounded five. In the end, the crews of Gonzalez and Cape St. George captured and treated twelve pirates (Department of the Navy–Naval Historical Center, 2006).

In March of 2007, Iran seized a British VBSS team at gunpoint. Leading up to this incident, the British team was operating in disputed waters that Coalition Forces and Iraq both viewed as Iraqi territorial waters, but Iran claimed the waters as theirs. The British team conducted a boarding on a vessel that they suspected of smuggling cars. At that time, Iranian ships approached the boat and detained the boarding team. The UK claimed that the Iranian ships forcibly escorted the boarding team into Iranian waters. Iran held the group of men, consisting of eight sailors and seven marines, until they consented to publicly stating that they were in the wrong by operating within Iranian territorial waters. This incident was similar to one in 2004, when Iran detained eight British servicemen for three days (“UK Sailors,” 2007).

On 31 May 2010, Israel experienced a political debacle due to a botched boarding. Unlike the boardings that the U.S. Navy currently performs, Israel utilized the boarding as a technique to enforce their blockade. The flotilla was stated to be carrying aid to the Gaza strip; however, it refused to adhere to Israel's requirement of entering an Israeli port to be searched for weapons. The purpose for the blockade was to ensure that vessels were providing aid to civilians, and not support to the Palestinian Islamic organization Hamas, which means Islamic Resistance Movement. When the flotilla refused to enter port and allow the search to take place, Israel conducted a boarding on the lead vessel, Mavi Marmara. Knowing that there were many activists onboard the vessels, Israel took precautions by arming the boarding team with nonlethal paintball guns for their primary weapons. However, in case they needed live ammunition for self-defense, they were still equipped with their secondary weapon. When the boarding took place, nearly 500 activists stormed the boarding team members

and tried to seize their weapons. This action resulted in a fight that led to the death of nine activists. Additionally, seven commandos were injured, two of which were serious (Harel, Issacharoff, & Pfeffer, 2010).

## **2. Operational Risk Management**

In an attempt to mitigate the dangers, or at least ensure that everyone from the Commanding Officer (CO) to the personnel performing the task understand the risk involved, the U.S. Navy Chief of Naval Operations released OPNAV Instruction 3500.39B: Operation Risk Management (ORM). This instruction provides the policy for all Navy military and civilian personnel, whether on duty or off, and it aims to “optimize operational capability and readiness by teaching personnel to make sound decisions regardless of the activity in which they are involved.” ORM is briefed to the CO prior to any evolution and consists of five steps:

1. Identify Hazards
2. Assess Hazards
3. Make Risk Decisions
4. Implement Controls
5. Supervise

Additionally, the brief includes a Risk Assessment Matrix (table 1) which graphically depicts what the hazards are, how severe they are, and what the probability of a mishap is. Each of these criteria aid in assigning an overall Risk Assessment Code (RAC), or an expression which combines each of the previously mentioned items into a single number that allows the CO to quickly assess the risk involved in conducting the operation. The Hazard severity consists of four categories and the Mishap Probability consists of four sub-categories. These items are defined within OPNAV Instruction 3500.39B as follows:

1. Hazard Severity – an assessment of the worst credible consequence that can occur as a result of a hazard.
  - i. Category I – The hazard may cause death, loss of facility/asset or result in grave damage to national interests.
  - ii. Category II – The hazard may cause severe injury, illness, property damage, damage to national or service interests or degradation to efficient use of assets.
  - iii. Category III – The hazard may cause minor injury, illness, property damage, damage to national, service or command interests or degradation to efficient use of assets.
  - iv. Category IV – The hazard presents a minimal threat to personnel safety or health property, national, service or command interests, or efficient use of assets.
2. Mishap Probability – The probability that a hazard will result in a mishap or loss, based on an assessment of such factors as location exposure (cycles or hours of operation), affected populations, experience or previously established statistical information.
  - i. Sub-category A – Likely to occur immediately or within a short period. Expected to occur frequently to an individual item or person or continuously to a fleet, inventory or group.

- ii. Sub-category B – Probably will occur in time. Expected to occur several times to an individual item or person or frequently to a fleet, inventory or group.
- iii. Sub-category C – May occur in time. Can reasonably be expected to occur some time to an individual item or person or several times to a fleet, inventory or group.
- iv. Sub-category D – Unlikely to occur.

**Table 1. Risk Assessment Matrix**

<b>RISK MATRIX PROBABILITY</b>					
		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b><u>SEVERITY</u></b>	<b>I</b>	1	1	2	3
	<b>II</b>	1	2	3	4
	<b>III</b>	2	3	4	5
	<b>IV</b>	3	4	5	5

## **E. HOW OTHERS OPERATE**

Often, when looking for a more efficient way of conducting business, one can simply start by analyzing similar organizations. In the case of VBSS, the United States Coast Guard (USCG) and United States Marine Corps (USMC) are two services that conduct the same mission. In recent years, the Marine Corps Maritime Expeditionary Unit Special Operations Command (MEUSOC) has been the only USMC command that has trained for VBSS missions. There is some evidence that in the near future, all sea going Marines will receive VBSS training, not just the SOC. However, due to the lack of documentation, this possibility will not be discussed further in this document.

In 1982, the need had arisen for the Department of Defense to address the issue of illegal drug trafficking into the United States. In response, the Coast

Guard officially established a Law Enforcement Detachment (LEDET) program that would train small detachments of Coast Guard personnel to serve as law enforcement specialists. This program expanded in 1986 when Public Law (P.L.) 99-570 authorized active duty USCG personnel to conduct drug interdiction operations from U.S. Navy vessels (U.S. Department of Homeland Security–United States Coast Guard, 2010). The USCG took another leap forward in 2004 when they established the Maritime Law Enforcement (MLE) Academy at the Federal Law Enforcement Training Center in Charleston, South Carolina. In an effort to increase the efficiency and effectiveness of the USCG personnel conducting maritime law enforcement, the MLE Academy offers five training programs (U.S. Department of Homeland Security–Federal Law Enforcement Training Center, 2010).

#### **1. Boarding Officer Qualification Support Program (BOQSP)**

The Coast Guard developed the BOQSP course to provide USCG personnel with a foundation of the fundamental tools required to facilitate law enforcement. The course lasts 11 days and covers the following curricula:

- Authority and jurisdiction
- Use of force
- Tactical procedures
- Criminal law
- Defensive tactics
- Arrest procedures
- MLE boarding procedures
- Personal Watercraft (PWC) boarding procedures
- Boating safety regulations
- Commercial fishing Industry regulations
- Boating und the influence enforcement

The BOQSP program consists of two sections, a self-paced e-Learning course and a residential practical course that focuses on maritime boarding procedures and shore-side operations. Each section of the program has a different set of prerequisites, which are as follows:

***e-Learning course***

- Selected Reserve (SELRES) member at a unit conducting law enforcement (LE) operations
- Either civilian LE experience or currently completing the LE Boarding Officer/Boarding Team Member Personnel Qualification Standards (PQS) program (or specifically recommended by parent command as a high potential for success in the program)
- Must be Boarding Team Member (BTM) qualified
- Unit has capacity to support qualification process: PQS reviews and certification (practical evaluation/boarding experience)
- Unit willing to dedicate individual's Inactive Duty for Training (IDT) periods to e-Learning program and On-the-Job Training (OJT) certification
- Will meet physical fitness criteria as set forth in the MLE PQS before attending the residential Boarding Officer Practical Course (BOPC)
- Will meet weapons criteria as set forth in the MLEPQS before attending the BOPC
- Ranks E-4 and above
- Available and willing to serve Active Duty for Training (ADT) during one of the 2-week BOPC courses
- Committed to completing program syllabus, including dedicating IDT/ADT time to the program
- Recommended by command and command is prepared to meet additional unit support requirements

- Mobilizing to a LE Contingency Personnel Requirements Lists (CPRL) billet

***BOPC residential course***

- Member possesses, in the opinion of the Commanding Officer (CO)/Officer in Charge (OIC), the requisite judgment, maturity, attitude, and aptitude to serve as a Boarding Officer
- Member has satisfactorily completed Task1-01 (annual physical fitness standards) of the Boarding Officer/Boarding Officer Team Member PQS, COMDTINST M16247.3 (series)
- Member has satisfactorily completed Task 1-02 (semi-annual M-9 weapons qualifications including the Judgmental Pistol Course) of the Boarding Officer/Boarding Officer Team
- Member has completed required PQS, COMDTINST M16247.3 (series)
- Member is within maximum allowable weight in accordance with Allowable Weight Standards for Coast Guard Military Personnel, COMDTINST M1020.8 (series)
- Members must have completed the Boarding Officer Web-Based Training prior to arrival at MLEA

**2. Marine Patrol Officer Course–Tactical (MPOC-T)**

The MPOC-T course is a two-week program designed specifically for Federal, State, and Local Marine Patrol Officers who will conduct operations alongside the USCG. Trainees receive the following instruction:

- Boarding procedures (including mock boardings)
- Vessel papers, hull identification numbers, federal documentation and licensing
- Federal boating safety carriage requirements
- Radiation pagers, meth labs, hazardous situations, and confined spaces

- USCG use of force policy
- Hand cuffing
- Pressure points
- Tactical procedures
- Basic navigation
- USCG vessel on vessel use of force
- Less than lethal technologies
- Security zone enforcement
- Search and rescue execution
- Boating under the influence (BUI)
- Federal firearms law, identification, documentation
- Advanced water survival techniques, performance scenarios
- Marine theft investigation
- Boating accident investigation

This course relates to the Navy's mission to train ally nations in proper boarding procedures. The purpose of providing this training is to increase the number of personnel conducting these missions, therefore, also increasing the ability to patrol a greater amount of territory.

### **3. U.S. Coast Guard Basic Boarding Officer Course (BOC)**

BOC is a 28-day course offered to both USCG personnel and foreign naval officers. The purpose of this course is to prepare the trainees to perform the arduous duties required of a Boarding Officer. The curriculum includes:

- Authority and jurisdiction
- Use of force
- Tactical procedures
- Criminal law
- Constitutional law
- Defensive tactics
- Arrest procedures

- MLE boarding procedures
- PWCS boarding procedures
- Confined spaces
- Boating safety regulations
- Commercial fishing industry regulations
- BUI enforcement
- Testify in court
- Hostage situations
- Fraudulent documents

Although this course is offered to foreign naval officers and USCG personnel, prerequisites only exist for the USCG personnel. These requirements are as follows:

- Member possesses, in the opinion of the CO/OIC, the requisite judgment, maturity, attitude, and aptitude to serve as a Boarding Officer.
- Member has satisfactorily completed an annual physical fitness test for the Boarding Officer/Boarding Team Member PQS.
- Member has satisfactorily completed the semi-annual M-9 weapons qualifications, including the judgmental pistol course.
- Member is within maximum allowable weight in accordance with Allowable Weight Standards for USCG Military Personnel, COMDTINST M1020.8 (series).
- Member must have either eighteen months remaining at current unit or have orders to a unit with specific law enforcement responsibility. They must also be conducting boardings within 3 months of graduation.

#### **4. U.S. Coast Guard Boarding Team Member Course (BTM)**

This nine-day course trains graduates to operate as a boarding team member under the supervision of a Boarding Officer. The course curriculum includes the following:

- Authority and jurisdiction
- Use of force
- Defensive tactics
- Arrest procedures
- Boarding procedures
- Tactical procedures
- Hostage situations
- Statement writing

There are no prerequisites for attending this course unless the trainee is also going to attend BOC, in which case, it is required to meet the BOC prerequisites before attending the BTM course.

#### **5. U.S. Coast Guard Radiation Detection Level II Operators Course (RADHAZ)**

The purpose of this course is to prepare graduates to conduct shipboard and ashore radiation detection operations. The program stresses “hands-on” practical experience to teach applicable concepts in radiological science and safety. Due to the nature of this course, teamwork, effectiveness, officer safety, and practical exercises are greatly emphasized. This three-day course includes the following curricula:

- Radiation concepts
- Introduction to radiological and nuclear weapons
- Introduction to boardings and level II radiation detection techniques
- RadPager (Personal Radiation Detector/PRD) Review
- Introduction to RadPack (Radiation Detection Backpack)

- Introduction to Identifinder (Radioisotope Identification Device/RIID)
- Policy and procedures: downloading spectra and reach-back operations

The following prerequisites apply to this course:

- Must be E-4 or above
- Members must have at least one year remaining at their unit or be transferring to a unit that conducts radiation detection.
- Individuals who will operate Level II RAD detection equipment are required to complete follow on Level I RAD training.

In summary, the U.S. Coast Guard has created an effective training pipeline, that is both in depth and highly specialized, for the specific job that the trainee will be qualified to conduct upon completion. These courses cover more information than the current U.S. Navy VBSS Team Trainer course that all boarding team members are required to complete. Additionally, the U.S. Navy Boarding Officer course is only five days, compared to the U.S. Coast Guard Boarding Officer course that is 28 days.

THIS PAGE INTENTIONALLY LEFT BLANK

### **III. METHODS**

Upon selecting his thesis topic, the author conducted a literature review to find information that had already been published on the topic of capability gaps within shipboard VBSS. The literature review did not uncover any research that had already been completed to address this topic specifically; therefore, the author began to search for a reasonable approach to obtain the data. Ideally, the research would have been conducted by visiting multiple ships at each homeport and overseas. Once aboard the vessels, the author would have conducted a survey, observed a training session, and reviewed records of prior training sessions and actual missions completed.

However, due to time and funding limitations, the author wanted to obtain accurate data without traveling to multiple commands. For this reason, a focus group was selected to determine the quality of the topic, and a survey was drafted to obtain the data. Each of these methods is beneficial for collecting data, saving time, and saving money because they can both be conducted without leaving the Naval Postgraduate School's (NPS) campus. It is important to note that individuals may have participated strictly because they felt strongly about the subject, whether it be good or bad, which could potentially skew the data. After evaluating the advantages and disadvantages to these methods, the author decided to continue with the focus group and survey for collecting the data.

#### **A. FOCUS GROUP ADMINISTRATION**

As with any study, the individual conducting the research believes that their topic, or idea, is important. For this reason, the author conducted a focus group to verify the validity of the perceived issues. To be effective, the author had to be careful not to inject his ideas or beliefs into the focus group discussion. Doing so would compromise the validity of the focus group and the research to follow. Additionally, though it did not appear to be an issue, the author had to be

aware of “groupthink,” which has been identified by Janis Irving (1972) as “faulty decision-making within a group due to the desire for unanimity at the expense of quality.”

Obtaining qualified participants was easy, thanks to the great support offered from other students at NPS. An electronic mail (Appendix A) was sent to all Surface Warfare Officers currently stationed at NPS requesting the participation of those who had VBSS experience. The target number of participants was five to ten, and within twenty minutes of transmitting the electronic mail, ten individuals had volunteered to participate. Of the ten volunteers, seven qualified Officers participated in the focus group.

The focus group was conducted in the Human Systems Integration Laboratory (HSIL), located on the NPS campus in Monterey, California. Upon arrival, each participant signed an informed consent form (Appendix B). The author then opened the focus group by asking the participants to discuss their opinion towards the effectiveness of how VBSS is currently set up. The open dialogue lasted seventeen minutes and the author did not need to interject. The focus group was digitally recorded, with the participants consent, to allow for more accurate data analysis.

## **B. SURVEY ADMINISTRATION**

Strict attention was paid to the wording of each question when developing the survey. It needed to accomplish the objectives that the research was seeking in as few questions as possible. Otherwise, the participants would lose interest and either skip the remaining questions or provide inaccurate responses. Additionally, the authors view point and beliefs could not be transparent or it would likely influence the results.

Once the author developed the questions that he felt were appropriate, he had four individuals with survey experience critique them. The final product started with an informed consent form (Appendix C) that the participants agreed to before continuing with the survey. The survey itself consisted of 17 questions

(Appendix D) that met the objectives of the research. The informed consent form and the questions were then placed into Survey Monkey, the desired instrument for fielding the survey.

To obtain participants for the survey, the author drafted a letter (Appendix E) that stated the purpose of the anonymous survey, and electronically mailed it to the Commanding Officers of 10 randomly selected U.S. Navy vessels. To choose the vessels, the author blocked them by homeport and ship class and then chose randomly as follows: three vessels from Naval Station Norfolk, three vessels from Naval Station San Diego, two vessels from Naval Station Mayport, and two vessels from Naval Station Pearl Harbor. The breakdown of ship classes were as follows: two guided missile cruisers (CG), two guided missile destroyers (DDG), two frigates (FFG), two amphibious dock landing ships (LSD), and two amphibious transport docks (LPD). Additionally, one of the LPDs was of the old Austin class and one was of the new San Antonio class.

Out of the ten randomly selected vessels, five Commanding Officers granted approval for utilizing their crew for the research. These five vessels were distributed across all four of the homeports and covered all of the ship classes; with the exception of the Austin class LPD. With approximately 21 qualified team members per vessel, there was a potential 105 respondents. The author fielded the survey to the five ships by sending an email to the boarding team members requesting their participation (Appendix F).

THIS PAGE INTENTIONALLY LEFT BLANK

## **IV. RESULTS**

### **A. FOCUS GROUP ANALYSIS**

The results from the focus group divided into three topical areas: materiel issues, manpower/personnel issues, and training issues.

#### **1. Materiel Issues**

Though “materiel” is not directly an HSI domain, it does play a large roll in the human factors and safety domains. The focus group indicated that there is a materiel discrepancy with the current small boats that are being utilized for transporting the VBSS teams to the vessel of interest.

Often, when a U.S. Navy asset is conducting VBSS or AAV operations, their team deploys for the better part of the day. This time requirement usually means that the team spends a large amount of that time in the RHIB. Since these RHIBs are not necessarily designed for long-term use by a team of six or more, the team will not have seats that are designed to absorb the impact from the waves. This can greatly affect the fatigue level of the sailors, both mentally and physically (Peterson & Bass, 2005).

The focus group also identified a maintenance issue. In the experience of the boarding officers in the focus group, their RHIBs required many maintenance hours to keep them operational. There may be a training issue for the individuals that are operating and/or conducting the maintenance on these small boats. One of the focus group participants mentioned that he recently participated in a North Atlantic Treaty Organization (NATO) deployment where they conducted exercises with multiple European nations. Many of the exercises were VBSS exercises where he was able to work with the various nations VBSS teams. According to this participant, the majority if not all, of the nations were better equipped and had better RHIBs than the U.S. boarding teams. More research will

be needed to confirm the allegations of the focus group that a capabilities gap exists with respect to materiel, namely the RHIBs used for VBSS.

## **2. Manpower/Personnel Issues**

Manpower and personnel were not large topics of discussion in the focus group, but the participants did feel strongly about the issue when comments were made. They all felt that to effectively operate the way that the VBSS program is currently set up, U.S. vessels need to not only increase the number of people (manpower) on board, but they must acquire the right people (personnel). These opinions confirmed the author's initial thoughts to include the effects of manning levels on the VBSS teams in the survey.

## **3. Training Issues**

The participants spent the majority of the time discussing training issues. As expected, they all believed that the Navy's push towards optimally manned ships has had a negative effect on the VBSS teams. The decrease in sailors onboard the ships has created a "manpower drain," which is not only having a negative impact on the MIO mission set, but on every mission set that the ships are currently involved in.

The participant who completed the NATO deployment also emphasized training. Not only did he report that these other nations teams were better equipped, but when he talked to their boarding officers, he found that VBSS was not a collateral duty for them as it is in the U.S. They were onboard to perform the VBSS mission set and only the VBSS mission set. This focus allowed their teams to train and build strong team cohesiveness before, and throughout, a deployment. For this reason, his observations led him to the belief that the U.S. VBSS teams were the least prepared when compared to the European nations that have a strong VBSS program.

The current VBSS team trainer course also was discussed in depth. All of the participants agreed that the course does an outstanding job in preparing the

sailors for noncompliant boardings, but it fails in many other areas. In particular, when sailors graduate from this course, they do not have an understanding of how to start a compliant boarding and ramp up to a noncomplaint boarding, if necessary. These sailors treat every boarding as though it is noncompliant and can easily deter local fisherman and mariners from sharing information. A noncompliant approach not only has a negative effect on information gathering capabilities, but it also has a negative effect on how mariners view the U.S. This method of conducting boardings goes hand in hand with AAVs. The schoolhouse does not train sailors in how to conduct the AAV mission set. The VBSS teams are left to “figure it out” on the fly, usually in theater. Again, the sailors approach, if done incorrectly, has a negative impact on the local fisherman. Instead of building relations with these fishermen, we tend to scare them. It was briefly mentioned that translators are a great asset when conducting AAVs, but ships often deploy without one.

The training pipeline that our sailors go through also fails to address detainee handling. Handling detainees is never covered in the schoolhouse, and is often over looked in the pre-deployment training cycle. When a mock boarding requires the VBSS team to take detainees, the training environment is stopped and the transportation and detention of the detainees is simulated. Detainee handling should be addressed because it not only affects the shipboard VBSS teams, but it affects the entire ship supporting the VBSS team. When taking detainees, considerable attention is given to provide a habitable location for them to be held where food, water, medical care, showers, etc. can easily be provided. These requirements are important in today's Navy due to the likelihood of housing detainees, but they add additional stress to the crew of the ships.

## **B. SURVEY ANALYSIS**

The results from the survey indicated that 45 individuals participated (evenly distributed across four of the ships with only one respondent from the fifth ship); however, one of the participants skipped every question. Therefore, the

results are based on 44 respondents. The denominator was calculated from five ships receiving the survey, each with an Allowable Equipment List (AEL) for 21 VBSS team members, making 105 potential recipients and an overall response rate of 41.9%. Of the 44 respondents, the answers to the survey were consistent across the platforms. Additionally, it is important to mention that one participant happened to be an embarked member from a Navy Expeditionary Intelligence Command (NEIC) unit. This individual's responses to the survey were still included even though VBSS is his/her primary job and that he/she would have received a greater amount of continuous training prior to embarking the ship that was surveyed.

To analyze the results, the author divided the questions into three categories: Manning, Training, and Deployment. Although manning can greatly affect the ability to train, these categories were the best fit for the data and in attempting to identify a capabilities gap.

### **1. Manning**

Of the 44 individuals that participated in the survey, 66% (29) of them responded that their ships manning levels currently have an effect on VBSS. The follow on questions broke down whether this was a positive or negative effect for both training and actual operations. As shown in Table 2, these results indicate that current manning levels have a negative impact on VBSS training, regardless of the ship.

**Table 2. Question 2 Results**

What was the impact that manning had on VBSS training opportunities?		
Answer Options	Response Percent	Response Count
Negative affect	87.1%	27
No affect	6.5%	2
Positive affect	6.5%	2
<i>answered question</i>		<b>31</b>
<i>skipped question</i>		<b>14</b>

**Table 3. Question 3 Results**

What impact did manning have on actual VBSS operations?		
Answer Options	Response Percent	Response Count
Negative affect	45.2%	14
No affect	48.4%	15
Positive affect	6.5%	2
<i>answered question</i>		<b>31</b>
<i>skipped question</i>		<b>14</b>

When it comes to actual operations, the current manning levels still have a negative impact in the opinion of 45% of the sailors that were surveyed (Table 3). This result could be looked at in two different ways. First, the majority of the individuals that replied with “negative affect” to actual VBSS operations may have been on the same ship(s). If this were the case, then it can be assumed that at least two of the five surveyed vessels (45% of the respondents divided by the five vessels that were surveyed) are affected by current manning levels during actual operations. Second, this result could simply indicate a trend among individuals within certain departments. If the later is true, the Navy has a large portion of sailors on every ship whom manning levels negatively affect during actual operations. If not addressed, both of these likely outcomes pose a problem for the Navy.

Manpower has a direct impact on a ship's watchbills. If a vessel has the right number of sailors, then they will be able to create watchbills that allow the ship to effectively and efficiently operate in support of each mission set, to include training. However, if there are not enough sailors, then personnel will often have to miss training exercises because the watchbills cannot be flexible. These manning conditions also have an impact on the fatigue level of the sailors because they will often be standing more watch, and working longer hours, to make up for the lack of personnel. Tables 4–6 indicate that the majority of the Navy's VBSS sailors are able to participate in actual operations, but watchbills are not flexible enough to allow them to participate in training on a regular basis (only 5.1% are able to). Additionally, nearly half of the sailors are not able to get at least six hours of sleep before actual VBSS operations. Fatigue can have a crucial impact on the sailors' ability to function and operate as needed, not only during a boarding, but also in their day-to-day routine.

**Table 4. Question 8 Results**

<b>Are the underway watchbills set up to allow you to participate in training on a regular basis?</b>		
<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
No	46.2%	18
Sometimes	48.7%	19
Yes	5.1%	2
<i>answered question</i>		<b>39</b>
<i>skipped question</i>		<b>6</b>

**Table 5. Question 9 Results**

Are the underway watchbills set up to allow you to participate in actual operations on a regular basis?		
Answer Options	Response Percent	Response Count
No	17.9%	7
Sometimes	51.3%	20
Yes	30.8%	12
<i>answered question</i>		<b>39</b>
<i>skipped question</i>		<b>6</b>

**Table 6. Question 10 Results**

On average, does your command give you an opportunity to get at least 6 hours of sleep prior to actual VBSS operations?		
Answer Options	Response Percent	Response Count
Yes	48.7%	19
No	51.3%	20
<i>answered question</i>		<b>39</b>
<i>skipped question</i>		<b>6</b>

## **2. Training**

When looking at VBSS training, physical fitness must be included. Although fitness does not necessarily improve the team's ability to clear a room more efficiently, it does contribute to building team camaraderie. Question 4 asked, "does your VBSS team PT together?" Of the 40 respondents that answered this question, 34 (85%) answered no, they don't PT together whether they are in port or underway. Based on that datum point alone, it would not be expected that these teams would frequently train together on actual VBSS skill sets. For the most part, this would be corroborated by the responses to the following questions.

**Table 7. Question 5 Results**

How often does your ship's VBSS team train while in port (not including PT)?		
Answer Options	Response Percent	Response Count
Less than once a Week	82.5%	33
Once a Week	12.5%	5
Twice a Week	0.0%	0
More than Twice a Week	5.0%	2
<i>answered question</i>		<b>40</b>
<i>skipped question</i>		<b>5</b>

**Table 8. Question 6 Results**

How often does your ships' VBSS team train while underway (not including PT)?		
Answer Options	Response Percent	Response Count
Less than once a Week	37.5%	15
Once a Week	42.5%	17
Twice a Week	20.0%	8
More than Twice a Week	0.0%	0
<i>answered question</i>		<b>40</b>
<i>skipped question</i>		<b>5</b>

**Table 9. Question 7 Results**

Does the amount of training differ between the work up cycle and actual deployment?		
Answer Options	Response Percent	Response Count
No, we train the same	12.5%	5
We train more often during work-ups	45.0%	18
We train more often during deployment	42.5%	17
<i>answered question</i>		<b>40</b>
<i>skipped question</i>		<b>5</b>

**Table 10. Question 13 Results**

In your opinion, were you fully prepared for the following VBSS related operations?					
Answer Options	Not prepared at all	Not quite prepared	Prepared fairly well	Very well prepared	Response Count
Boardings	0	3	17	4	24
Approach, Assist, Visits (AAVs)	2	3	12	7	24
Detainee Handling	0	7	9	8	24
<i>answered question</i>					<b>24</b>
<i>skipped question</i>					<b>21</b>

Tables 7–9 show that current shipboard VBSS teams are not training often enough to stay proficient. This insufficient training is likely a result of VBSS being a collateral duty and the ships being tasked with many other demanding mission sets requiring the sailors' time. Table 10 on the other hand, indicates that these sailors often feel as though they are either fairly well prepared or very well prepared for the different MIO mission sets. This belief needs to be evaluated further to determine whether shipboard sailors are truly prepared for each of these MIO missions, or if it is simply a false sense of security resulting from completing the VBSS Team Trainer course.

### 3. Deployment

To determine the experience level of the VBSS Team Members that responded to the survey, two questions were included pertaining to deployments. The first question asked if the individual has made a deployment as part of their ship's VBSS team. Of the 38 respondents who answered this question, 30 (78.9%) had made at least one deployment and were then directed to the second question, which can be seen in Table 11. These results indicate that the majority of the individuals who responded to this survey had some experience in actual MIO missions. These experiences may have skewed the responses in table 10 due to the individuals learning, and adapting, throughout the course of their

deployment. Further research needs to be conducted to determine how safe and efficient current VBSS teams operate, and how that pairs to these individuals' opinions regarding their preparedness.

**Table 11. Question 12 Results**

During your last deployment, in how many months did your VBSS team conduct actual operations?		
Answer Options	Response Percent	Response Count
0	20.0%	6
1-2	36.7%	11
3 or more	43.3%	13
<i>answered question</i>		<b>30</b>
<i>skipped question</i>		<b>15</b>

#### 4. Summary

The analysis of the survey indicates that capabilities gaps exist with manpower and training. These findings are more evident in the open-ended answers to question sixteen, where twenty respondents provided feedback. Of these responses, thirteen mentioned that training was inadequate onboard the ships, nine mentioned that manning created a burden for the teams, and one individual was not happy with the current materiel that VBSS teams are issued. It is important to note that two individuals recommended that VBSS become its own rate, where the individuals embark a ship for deployment. In particular, respondent number thirteen stated (Appendix G):

I also feel that VBSS should be a primary duty, or rate and not a collateral duty. To pull sailors that primarily deal with maintaining extremely expensive combat systems and engineering equipment, and then ask them to instantly switch mindsets to go board a suspect vessel is near reckless. This practice yields sailors that are mediocre technicians and mediocre boarding team members, and puts lives at risk on the RHIB, on the vessel, and the ship.

Although future research would need to be conducted in regards to the effectiveness of “switching mindsets,” this respondent has valid concerns. Additionally, many of the comments criticized the current operational tempo

(OPTEMPO) that the Navy maintains while both inport and underway due to the negative effect that it has on shipboard training, not just VBSS training (Appendix G).

THIS PAGE INTENTIONALLY LEFT BLANK

## **V. CONCLUSION AND RECOMMENDATIONS**

### **A. CONCLUSION**

The results from the focus group and the survey support the hypothesis that potential capabilities gaps exist within U.S. Navy Shipboard VBSS teams. Furthermore, the data indicates the capabilities gaps fall mainly within the HSI domains of training and manpower. VBSS as a collateral duty, and the Navy's push towards an optimally manned fleet, have led to a current manning deficit, which does not allow the opportunity for ships to effectively train their embedded VBSS teams.

### **B. RECOMMENDATIONS**

Based on the findings, the author recommends increasing VBSS efficiency through the following methods.

#### **1. Embarked Units**

The U.S. Navy currently utilizes embarked units for warfare areas that require specialized training. As mentioned earlier, two of the respondents left feedback that recommended this approach be utilized for VBSS as well. A great example of embarked units in current operation is the Navy Explosive Ordnance Disposal (EOD) teams. These units often embark and deploy with Carrier Strike Groups (CSG). Additionally, mine countermeasure ships (MCM) often embark an EOD detachment before conducting an exercise or live operation where their expertise may be needed. Another key example of a unit that will embark a ship when needed is an Information Exploitation Team (IET). These small teams, often 1 to 3 members, will embark a vessel when their assistance is needed in gaining tactically viable information.

Since creating the Navy Expeditionary Combat Command (NECC), the Navy also has stood up a small number of Helicopter-borne VBSS (HVBSS) teams. These units go through the same training pipeline as the standard

shipboard VBSS units, but they receive additional training to be able to deploy via fast rope from a helicopter. This HVBSS capability brings a lot to the table when planning for a mission because the ship's freeboard height is no longer an issue for conducting the boarding when helicopter assets are available.

My recommendation would be to utilize these HVBSS units as the primary means of conducting VBSS operations. These units would still utilize the ships RHIBs for the majority of their boardings. However, when a high freeboard boarding is required and a helicopter asset is available, the ship would already have a qualified boarding team onboard. Having an embarked HVBSS team will save the Navy much needed time between acquiring the vessel of interest and having a boarding team onboard the contact. Disbanding the shipboard VBSS teams and moving to a strictly embarked unit also would benefit the Navy in other ways. The efficiency of our Navy ships would increase by removing a major collateral duty from their personnel. These individuals would not have to balance VBSS training with their primary duties onboard. Almost any sailor will tell you that they do not have enough time in the day to accomplish all of their required tasks (Haynes, 2007).

The HVBSS units would be able to train together every day, as opposed to once a week with the shipboard teams, since it would be their primary duty. This increased training time, as well as the fast rope capability that they offer, would greatly increase the efficiency of boardings and AAVs. Additionally, the HVBSS units can easily incorporate Intelligence Exploitation Team (IET) members that are trained in tactical questioning, which if needed, allows them to obtain greater information than the current shipboard VBSS teams.

Once a strike group begins the workup cycle, these HVBSS units would embark each ship within that strike group. VBSS training is already included in the workup cycle, therefore, there would not be any additional burden required by the ships for conducting training with these embarked units. The limiting factor would be space. These embarked units would require berthing, which falls short on many ships, but it could be feasible. The space required for their gear would

not be as much of an issue since the ships would no longer have to maintain their own VBSS Authorized Equipment List (AEL).

To allow these HVBSS units to provide an even larger asset to the ships they embark, their mission set, and to the Navy as a whole, it would be beneficial to include language training for at least three of the individuals on the team (one per seven-man squad). These three individuals could each be trained in a different language for the target region that the ships will be deploying to. The added language capability would increase the effectiveness of querying vessels prior to conducting boardings, gaining viable information from the crew while conducting the boardings, and would greatly aid in gaining a good relationship with the local merchant traffic. All of these recommendations would contribute to the Navy's effectiveness in conducting MIO.

## **2. Deployable Mission Trainer**

Initially, the author was intrigued by the VBS 2 serious game that the Marine Corps and Army have begun to incorporate into their training regimen. If this system works for them, why can the Navy not make it work for VBSS training? Ideally, a training system like VBS 2 would allow the team to train around their ship's schedule. If the entire team cannot make a training session, which is currently common practice based on the author's data, as little as one individual can log into the serious game and conduct some level of training. This opportunity would maximize training while minimizing cost and space, which are both extremely important on a ship. Though serious games may work, and future research could support it as a viable option, the surface warfare community may not be as accepting of it.

However, an Indoor Simulated Marksmanship Trainer-Enhanced (ISMT-E) can provide efficient weapons training while underway. The ISMT-E is a proven system through the Marine Corps and is already available on some of the fleets Amphibious ships. This option would not solve all of the training issues, but would provide an opportunity for the ship to routinely rotate VBSS, ship's reaction

force (SRF), and backup reaction force (BRF) members through weapons training, both in port and underway. Additionally, sailors could train on the system in small groups of two to four. This would allow their departments to be more flexible in allowing team members to participate in training opportunities since they would not lose all of their VBSS team members at the same time.

If the Navy wants to maintain the status quo of conducting MIO via embedded shipboard teams, it is highly recommended that more research be conducted on utilizing at least one of these two electronic training aids to supplement their training regimen. A combination of these two training aids could potentially provide the most efficient training to VBSS sailors with minimal impact on manning. Regardless, the fleet is currently lacking in VBSS training once the sailors complete the team trainer course.

### **3. Summary**

Although more research is required to determine the overall effectiveness and implications of the recommendations, it is important to restate that the following resolutions may close the current capabilities gaps:

1. Embarked units
  - a. Increased capabilities
    - i. Helicopter-borne insertions
    - ii. Tactical questioning
    - iii. Opportunity to include linguists
  - b. More training opportunities
    - i. VBSS won't be a collateral duty
    - ii. More follow on schools while in the Continental United States (CONUS)

- c. Already in practice
    - i. EOD
    - ii. HVBSS (in small numbers)
- 2. Deployable mission training
  - a. Increased training opportunities
    - i. Individual or team
    - ii. Serious games can be loaded on any computer
  - b. Already in practice (USMC and USA)
    - i. VBS 2
    - ii. ISMT-E

## **C. FUTURE RESEARCH**

Along with the recommendations that have already been made, future research is needed to continue the efforts in ensuring that the VBSS system is operating as efficiently and safely as possible.

### **1. MIO Commander Training**

Though the research did not address this issue, the author learned through personal experience that the vessel operating as the MIO Commander for the strike group does not receive any training on the tasks/duties that are required of them. For the most part, it is obvious as to what they need to do, but given that the majority of current O-4s and higher do not have VBSS/MIO backgrounds, they rely heavily on their VBSS Boarding Officers. This is not always efficient and can pose problems. For example, if a ship is utilizing their BOs to rotate through the MIO Commander watch station, then who fills the position if a boarding requires the full team? Further research and development needs to be conducted to provide these ships with a viable training medium for not only training individuals to fill the MIO Commander watch station, but also to

provide the Department Heads, Executive Officer (XO), and Commanding Officer (CO) the proper guidance for operating as the MIO Commander throughout a deployment.

## **2. Equipment**

Proper equipment is vital to the VBSS system. It can essentially save an individual's life or limit their ability to perform as needed. It is essential that more research be conducted to enhance the equipment available to VBSS teams.

As mentioned earlier, the focus group identified the issues that may exist with the current small boats in the Surface Navy's inventory. These small boats not only provide the means for transporting the VBSS team members to the target vessel, but they also are utilized to transport detainees, rescue a man overboard, transfer personnel from one ship to another, and to complete many other tasks. The research needs to be conducted to determine if the current RHIBs that are being utilized are appropriate for the missions that require their use. This research needs to include, but not be limited to, issues of human factors, training, manpower, personnel, and cost.

Another key area that needs to be investigated is the ballistic vest that the VBSS team members' wear. These vests are supposed to provide ballistic protection, a flotation device, and the ability to carry essential equipment for completing their tasks. However, the ballistic plates that are in the current vests do not offer the same protection as those that are provided to the Marine Corps and U.S. Army (as indicated on the plates themselves). It would be beneficial to compare the current plates to the ESAPI ballistic plates that those two military services utilize. Why should sailors that are boarding a potentially hazardous vessel have equipment that is inferior to what the Department of Defense is currently purchasing? Additionally, the flotation device that the current vests utilize is a thick foam materiel. This bulky material slows the sailors down and hinders their movement through a vessel due to the increased circumference. It

would be beneficial to compare current flotation devices that are on the market to determine if there is an effective replacement to the current flotation material.

### **3. Summary**

Over the last decade, MIO has become a primary mission for the U.S. Navy. For this reason, a concerted effort should be given to increase VBSS capabilities. Future research is needed to enhance the training and equipment that sailors receive upon graduating from the required schools. A trade-off analysis is strongly recommended to determine whether the Navy could facilitate shifting from embedded VBSS teams to embarked HVBSS teams. Improving VBSS proficiency is important to the future of the Navy's MIO capabilities.

THIS PAGE INTENTIONALLY LEFT BLANK

## **APPENDIX A. REQUEST FOR VOLUNTEERS (FOCUS GROUP)**

Fellow SWOs,

As part of my thesis, I will be conducting a focus group discussion. The purpose of this focus group is to examine whether or not a capabilities gap currently exists within U.S. Navy shipboard Visit, Board, Search, Seizure (VBSS) teams. The focus group will require 5-10 SWOs, preferably with VBSS experience, to engage in approximately 20 minutes of conversation. Please respond if you can support my thesis and participate in the focus group, which will take place Thursday, 18 February, at 1200, location TBD.

V/R

Kevin Ray, LT, USN

THIS PAGE INTENTIONALLY LEFT BLANK

## APPENDIX B. INFORMED CONSENT (FOCUS GROUP)

### Naval Postgraduate School Consent to Participate in Research

**Introduction.** You are invited to participate in a research study to determine if a capabilities gap currently exists within the United States Navy's Visit, Board, Search, Seizure (VBSS) shipboard assets. If it is determined that a capabilities gap does exist, the study will examine potential methods that the Navy could correct the deficiencies.

**Procedures.** The focus group is being conducted in person in the Human Systems Integration Laboratory. *It should take no more than 20 minutes.*

**Voluntary Nature of the Study.** Your participation in this study is strictly **voluntary**. If you choose to participate you can change your mind at any time and withdraw from the study. You will not be penalized in any way or lose any benefits to which you would otherwise be entitled if you choose not to participate in this study or to withdraw.

**Potential Risks and Discomforts.** The potential risks of participating in this study are inadvertent disclosure of individual focus group responses. To mitigate this risk, the project has implemented extensive data safeguarding procedures, a copy of which is available from the principle investigator, LT Kevin Ray. Yet, even with such procedures in place, there always remains some risk, however small, of a data breach.

**Anticipated Benefits.** Anticipated benefits from this study are potentially increasing the effectiveness of U.S. Navy VBSS teams by identifying and examining solutions for current capabilities gaps. You may directly benefit from this study in future operations in which your ship may be involved.

**Compensation for Participation.** No tangible compensation will be given. A copy of the research results will be available at the conclusion of the experiment via e-mail (kmray@nps.edu).

**Confidentiality & Privacy Act.** Any information that is obtained during this study will be kept confidential to the full extent permitted by law. All efforts, within reason, will be made to keep your personal information in your research record confidential but total confidentiality cannot be guaranteed. Your participation in the focus group will not be disclosed. However, it is possible that the author may be required to divulge information obtained in the course of this research to the subject's chain of command or other legal body.

**Points of Contact.** If you have any questions or comments about the research, or you experience an injury or have questions about any discomforts that you experience while taking part in this study please contact the Principal Investigator, LT Kevin M. Ray, 656-2786, kmray@nps.edu. Questions about your rights as a research subject or any other concerns may be addressed to the Navy Postgraduate School IRB Chair, Dr. Angela O'Dea, 831-656-3966, alodea@nps.edu.

**Statement of Consent.** I have read the information provided above. I have been given the opportunity to ask questions and all the questions have been answered to my satisfaction. I have been provided a copy of this form for my records and I agree to participate in this study. I understand that by agreeing to participate in this research and signing this form, I do not waive any of my legal rights.

\_\_\_\_\_  
Participant's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Author's Signature

\_\_\_\_\_  
Date

## APPENDIX C. INFORMED CONSENT (SURVEY)

### Naval Postgraduate School Consent to Participate in Research

**Introduction.** You are invited to participate in a research study to determine if a capabilities gap currently exists within the United States Navy's Visit, Board, Search, Seizure (VBSS) shipboard assets. If it is determined that a capabilities gap does exist, the study will examine potential methods that the Navy could correct the deficiencies.

**Procedures.** The survey is being conducted via the web. *It should take no more than 15 minutes to complete.*

**Voluntary Nature of the Study.** Your participation in this study is strictly **voluntary**. If you choose to participate you can change your mind at any time and withdraw from the study. You will not be penalized in any way or lose any benefits to which you would otherwise be entitled if you choose not to participate in this study or to withdraw.

**Potential Risks and Discomforts.** The potential risks of participating in this study are inadvertent disclosure of individual survey responses. To mitigate this risk, the project has implemented extensive data safeguarding procedures, a copy of which is available from the principle investigator, LT Kevin Ray. Yet, even with such procedures in place, there always remains some risk, however small, of a data breach.

**Anticipated Benefits.** Anticipated benefits from this study are potentially increasing the effectiveness of U.S. Navy VBSS teams by identifying and examining solutions for current capabilities gaps. You may directly benefit from this study in future operations in which your ship may be involved.

**Compensation for Participation.** No tangible compensation will be given. A copy of the research results will be available at the conclusion of the experiment via e-mail (kmray@nps.edu).

**Confidentiality & Privacy Act.** Any information that is obtained during this study will be kept confidential to the full extent permitted by law. All efforts, within reason, will be made to keep your personal information in your research record confidential but total confidentiality cannot be guaranteed. Your participation in the survey and your individual responses to the survey will not be disclosed. However, it is possible that the author may be required to divulge information obtained in the course of this research to the subject's chain of command or other legal body.

**Points of Contact.** If you have any questions or comments about the research, or you experience an injury or have questions about any discomforts that you experience while taking part in this study please contact the Principal Investigator, LT Kevin M. Ray, 656-2786, kmray@nps.edu. Questions about your rights as a research subject or any other concerns may be addressed to the Navy Postgraduate School IRB Chair, Dr. Angela O'Dea, 831-656-3966, alodea@nps.edu.

**Statement of Consent.** I have read the information provided above. I have been given the opportunity to ask questions and all the questions have been answered to my satisfaction. I have been provided a copy of this form for my records and I agree to participate in this study. I understand that by agreeing to participate in this research and signing this form, I do not waive any of my legal rights.

## APPENDIX D. SURVEY QUESTIONS

1. Did your ships manning levels have an effect on VBSS?

Yes

No

**If Yes**

a. What was the impact that manning had on VBSS training opportunities?

Negative affect

No affect

Positive affect

b. What impact did manning have on actual VBSS operations?

Negative affect

No affect

Positive affect

2. Does your VBSS team PT together?

No

In port only

Underway only

Both in port and underway

3. How often does your ships' VBSS team train while in port (not including PT)?

Less than once a Week

Once a Week

Twice a Week

More than Twice a Week

4. How often does your ships' VBSS team train while underway (not including PT)?

Less than once a Week

Once a Week

Twice a Week

More than Twice a Week

5. Does the amount of training differ between the work up cycle and actual deployment?

No, we train the same

We train more often during work-ups

We train more often during deployment

6. Are the underway watchbills set up to allow you to participate in training on a regular basis?

No  
Sometimes  
Yes

7. Are the underway watchbills set up to allow you to participate in actual operations on a regular basis?

No  
Sometimes  
Yes

8. On average, does your command give you an opportunity to get at least 6 hours of sleep prior to actual VBSS operations?

No  
Yes

9. Have you made a deployment as part of your ship's VBSS team?

No  
Yes

10. During your last deployment, in how many months did your VBSS team conduct actual operations?

0  
1-2  
3 or more

11. In your opinion, were you fully prepared for the following VBSS related operations?

Boardings

Not prepared at all  
Not quite prepared  
Prepared fairly well  
Very well prepared

Approach, Assist, Visits (AAVs)

Not prepared at all  
Not quite prepared  
Prepared fairly well  
Very well prepared

Detainee Handling

Not prepared at all  
Not quite prepared  
Prepared fairly well  
Very well prepared

If you answered 'no' or 'somewhat' to any of the above questions:

How were you not prepared (select all that apply)?

Training pipeline was not sufficient

Shipboard training was not/is not sufficient

Other (please explain)

12. Are there any other comments regarding your experiences with VBSS that are not previously addressed with this survey?

13. What is your rank?

14. What is your rate?

THIS PAGE INTENTIONALLY LEFT BLANK

## **APPENDIX E. LETTER TO COMMANDING OFFICERS**

Sir,

I am a fellow Surface Warfare Officer currently stationed at the Naval Postgraduate School. I am currently one year into my curriculum and have started working on my thesis. The goal of the thesis is to identify a possible capabilities gap within VBSS and, if needed, to propose solutions to close the gap. With your approval, I would like to provide each of your qualified VBSS Team Members with a short survey/questionnaire to gather data on this important issue.

The survey will consist of approximately 20 questions and will be focused on the following objectives:

- a. Determine if there is a Capabilities GAP in VBSS Training
  - i. Is the GAP during the training pipeline?
  - ii. Is the GAP after the training pipeline?
    - 1. In-port
    - 2. Underway
- b. How often does your team train?
  - i. In-port
  - ii. Underway
    - 1. Training Cycle
    - 2. Deployed

- c. Does the command support VBSS?
  - i. In-port
    - 1. Training
    - 2. PT
  - ii. Underway
    - 1. Training
    - 2. Watchbills
    - 3. PT
    - 4. Sleep (night prior to boardings)
- d. Do your ships manning levels affect VBSS?
  - i. VBSS training
  - ii. VBSS operations

Although the survey will be asking questions about command support, the survey will be kept confidential and the names of the participants and their ships will remain anonymous. The purpose of the survey is to identify common issues across the Navy in order to develop a solution that can improve the capabilities, and overall safety, of our boarding teams.

Additionally, I am looking at comparing the results between “optimally” manned vessels and vessels with regular manning. If you approve of your VBSS team participating in the survey, can you also inform me if your vessel is considered “optimally” manned? I will be pleased to provide a copy of my completed thesis to you, at your request. Thank you for your time, assistance, and consideration.

V/R

Kevin Ray, LT, USN

## **APPENDIX F. REQUEST FOR VOLUNTEERS (SURVEY)**

VBSS Team Member,

You have been selected to participate in a voluntary study about improving VBSS capabilities and training. The purpose of this study is to determine VBSS training capability gaps and to propose solutions for closing these gaps. This short survey consists of approximately 20 questions and should not take more than 15 minutes of your time. Please click here ([SurveyMonkey link](#)) to participate.

V/R

Kevin Ray, LT, USN

If you are not a qualified VBSS Team Member, please click here ([opt-out link](#)).

THIS PAGE INTENTIONALLY LEFT BLANK

## APPENDIX G. RESPONSES TO THE SURVEY OPEN ENDED QUESTIONS

Reply Number	Question # 15 - Other (please specify)
1	The VBSS school house (and to a lesser extent, the Unit-Level training schedule) is good training for large vessels and actual boardings. However, we are given little, if any, formal training in AAV and other kind of nonMIO boardings (CNT, Counter-Piracy, etc.). This has to essentially be invented by the ship's team members.
2	VBSS not a priority on my ship. Little to no support to chain of command.
3	The schoolhouse taught me all about noncompliant boardings, but nothing about how to approach a fisherman and build rapport.
4	not enough emphasis on training and maintaining skills already attained.
5	ship's manning does not allow for consistent training while inport or underway.
6	VBSS pipeline was descent but some techniques have changed and shipboard training/ techniques vary.
7	Being on a boat out of Hawaii we get deployed a lot. So when we are in port or out VBSS training always gets pushed off. Its like Captains think that we will never have to use the skill we learned and we should train for real events such as GQ's and ATEP. Then while we are in port we are always preping for some kind of cert. I see it as a joke for the Navy, no one takes it seriously. Its always something that "wont ever happen" but when it does and something goes wrong everyone is going to look at the training.

Reply Number	Question # 16 - Response Text
1	<p>Our last deployment was exclusively focused on Counter-Piracy, boarding only extremely small vessels (skiffs, dhows and fishing boats). From my knowledge of other ship's deployments, their experiences are similar - traditional MIO boardings are rare.</p> <p>The training pipeline, however, seems to focus exclusively on boarding merchants in a traditional MIO mission.</p> <p>In terms of manning, the collateral nature of the team makes it difficult to accomplish some tasks - everyone on the team works for the VBSS team only indirectly, so the priority is usually on whatever that person's real job is, vice the VBSS team.</p>
2	<p>Training cycles prove to be useful. The only down side is most evaluation teams, whether ATG or someone else are very inconsistent with grading criteria. Everyone needs to be on the same page to make sure everyone is executing operations as required.</p>
3	N/A
4	<p>VBSS encompasses a wide variety of operations, including AAVs, FVVs, approaches, visits, boardings and more. The school house focused only on the worst case scenario, and kept everything and everybody at a ramped up level. I have conducted over 150 AAV/Boardings in my last two deployments, and have yet to need a pistol. That being said, the NCB training is definitely necessary, but more rapport building and better searching procedures needs to be covered. I suggest a cross-service training opportunity with either NEIC out of VA, or the Coast Guard LEDET guys in between deployments in SSE/TSE.</p>
5	<p>Training is a big challenge for VBSS teams onboard. The ships training cycle and optempo have made it difficult to get all team members together at one time to conduct training.</p>

6	<p>The process prior to boarding a suspect vessel (obtaining permission from whoever it may be in charge of overall operations.) takes entirely too long and is in fact hindering the teams ability to conduct a swift and smooth boarding. for example: the team is usual dressed out and ready to board the RHIB within 12 minutes of being called away. however, it sometimes would take over 45 min to an 1.5 hours for the "ok" to board order to come down. which gave the suspected vessel time to get away or dispose of any illegal materials they may have..... how is this effective?</p>
7	<p>With how manning is right now on this Platform. There is barely enough time to train and work out as a team because everyone is so busy doing there in rate jobs. Allot of times we are being pulled to do FSA, Flight Deck, SCAT and other duties that require time away from VBSS. Setting time aside becomes secondary to what really counts and that is to keep our proficiency and motivation as high as possible. There is not enough time in the day to complete everything that is required of us. Needless to say I am burned out and just want someone that counts numbers to understand we need additional personnel on active duty to complete all of our missions safely. But that want happen because the money is not there to enlist more personnel. So here we are suffering. Time is now to act.</p>

8	<p>My command NEIC has teams that are dedicated assets to Navy VBSS. Our primary mission is to forward deploy to ships integrate with their VBSS teams and operate with them while they are deployed. With that being said I have been attached to more than 30 platforms and conducted more than 300 VBSS operations since 2006. I also spend time while in ports assisting CSFTL assessing VBSS teams. In all my time doing this I see some of the same issues that plague most teams. Senior level leadership and involvement from the Chiefs and first class mess's. This effects the amount of training that is provided, if it is supported and divisions require their team to attend. Not enough emphasis put on VBSS training except for right before fleet level exercises. This is not all teams but a majority. Few teams PT together and conduct training on a constant basis, those teams stand out leaps above the other teams. There is also a huge difference in the teams that members with multiple deployments in the leadership roles such as a second tour BO or senior enlisted. Biggest issue is teams are trained on worst case scenario in the school house. I could not even begin to make up the numbers for the amount of VBSS operations that have been conducted over the past 10 years but I am sure it is well less than a tenth of a percent that have been hostile in nature. Of those most were hostile during the approach phase of the operation. The Navy does not arm our VBSS teams with the knowledge of cultural sensitivities, rapport building and collection of information. These are all areas in which my command tries to help by providing training on those topics while onboard ships operating with their teams. This is a noticeable gap in training and what is provided by my command helps fill the gap for the ships that we deploy to but leaves a lot of ships with this huge gap in what is the most important part of our job showing the US Navy and it's coalition partners care about the people and build partnership and trust amongst the maritime community.</p>
9	<p>I think pt standards should be raised to a higher standard for the teams. i think thier should be more time allotted for the team to train.</p>
10	<p>LPD 18 is so undermanned, it is almost impossible for engineers to make all training evolutions or be off the watchbill while deployed in 5th fleet area</p>
11	<p>Being on a ship with as high of an optempo as this one is a challenge when it comes to VBSS training. It's very difficult to get your entire team together for training, even for only 2 hours every week. There are always multiple team members on watch or taking part in another mandatory meeting or evolution. Our training on the last deployment was limited specifically because of this.</p>

12	<p>Just wanted to say that my answers were biased. I am, for roster reason, a part of the NC/VBSS team. However, I haven't been an integral part of the team for around 2 to 2 1/2 years. I volunteered with specific people for specific reason. Once those personnel moved on, the team (not the current outfit) took a turn that I didn't want to be associated with. The VBSS operations I answered to were conducted 2-3 years ago. Entire teams were still standing watch and coming off of the rev (0200-0700) watch, holiday routines were few and far between for team members, and dinners were always cold. If you asked any one of those members, though, if they'd go back to that team and deal with all the short comings of the job again, they'd answer yes. Without a doubt. Op-Tempo increase blows, but the crew will always manage to get behind one another and complete a task. Any task.</p>
13	<p>When conducting 7th fleet operations we rarely train, if at all, underway. If conducting 5th fleet operations, a much larger emphasis is placed on VBSS proficiency.</p> <p>I also feel that VBSS should be a primary duty, or rate and not a collateral duty. To pull sailors that primarily deal with maintaining extremely expensive combat systems and engineering equipment, and then ask them to instantly switch mindsets to go board a suspect vessel is near reckless. This practice yields sailors that are mediocre technicians and mediocre boarding team members, and puts lives at risk on the RHIB, on the vessel, and the ship.</p>
14	<p>VBSS operations would drastically improve if ships were required to send their VBSS personnel to refresher schools at least once a year. This would allow the teams to learn to work together and get valuable advice from VBSS trainers on how to train on the ship. In addition, Commanding Officers should be required to have their VBSS teams PT together. Standard physical training with the command will not suffice for VBSS members; due to the nature of the job a higher intensity training program should be implemented. CENSECFOR VBSS instructors should be evaluating the ships for Ultra Sand all VBSS certifications. Most ATG members are not efficient in tactics themselves; therefore they are not capable of evaluating the teams efficiently.</p>

<b>15</b>	I would like to see more refresher classes done with qualified instructors to make sure that boarding teams are keeping up proficiency. A push to the CO's and XO's of all commands the importance of VBSS training to keep the teams sharp and aware of everything that goes on during a boarding.
<b>16</b>	VBSS is an awesome capability, however the amount of regular training coupled with out commitments to the ship outside of the VBSS mission make it difficult for the ship's watchbill and manning. Generally, we are taken off the watchbill during VBSS operations which could put other watchstations in port and starboard for extended periods of time. The alternative would be to send VBSS detachments to ships, making some things more efficient/effective - but those benefits would be moderated by the lack of integration between the ship and the detachment. End result, VBSS training and operations need to be reflected in ship's manning levels.
<b>17</b>	ships do not provide adequate funding for materials. VBSS is a serious mission that has a very high potential for mishaps, but it is not treated that way by the chain of command. AEL's are also not updated by shore side for up to date items that should be held during reviews and spot checks of equipment.
<b>18</b>	We train everyday for events that most people in the Navy will never see, why do we train so little for people who are risking their life going to another boat and maybe earning an extra \$150 a month.
<b>19</b>	The initial team trainer school should be longer. I felt three weeks was too short.
<b>20</b>	Maybe it's just this ship but, we need to train better than what we do now. Our team is brand new now and we have not worked together before. I feel really uncomfortable working with this team because I have not trained with them and we are not as one. I just don't have the trust in this new team to do a boarding because of lack of training. we need to train not just for inspection but for real life.

## LIST OF REFERENCES

- Barlow, M., Morrison, P., & Easton, A. (2002). 1st-person tactical shooters: COTS games with military training potential? *Proceedings of SimTecT 2002*, Melbourne, AU.
- Bossard, C., Kermarrec, G., Buche, C., & Tisseau, J. (2008). Transfer of learning in virtual environments: A new challenge? *Virtual Reality*, 12(3), 151. Retrieved 03 January 2010 from <http://proquest.umi.com/pqdweb?did=1549680771&Fmt=7&clientId=65345&RQT=309&VName=PQD>
- Brown, B. (2010). A training transfer study of Virtual Battlespace 2. Master's thesis, Modeling, Virtual Environments and Simulation department, Naval Postgraduate School, Monterey, CA.
- Burke, L. A., & Hutchins, H. M. (2007). Training transfer: An integrative literature review. *Human Resource Development Review*, 6(3), 263. Retrieved 03 January 2010 from <http://proquest.umi.com/pqdweb?did=1326727541&Fmt=7&clientId=65345&RQT=309&VName=PQD>
- Chapman, S. (2001). The management of stress and fatigue amongst Royal Australian Navy submariners: A strategic, operational and financial imperative. Canberra, Australia: Australian Defense Headquarters.
- Commandant Instruction M1020.8G. (2008). Coast Guard weight and body fat standards program manual.
- Commandant Instruction M16247.3B. (1997). Boarding Officer/Boarding team member personal qualification standard (PQS).
- Defense Acquisition Guidebook*. (2008). Retrieved 03 January 2010 from <https://dag.dau.mil/Pages/Default.aspx>
- Department of the Navy – Naval Historical Center. (2006). Dictionary of American Naval Fighting Ships. Retrieved 09 December 2009 from: <http://www.history.navy.mil/danfs/g6/gonzalez.htm>
- "Fatigue." (n.d.). In Merriam-Webster Dictionary online. Retrieved 05 January 2010 from Merriam-Webster Online Dictionary website: <http://www.merriam-webster.com/dictionary/fatigue>
- Fatigue management guide. Retrieved 20 May 2009 from [http://www.deir.qld.gov.au/pdf/whs/fatigue\\_management2005.pdf](http://www.deir.qld.gov.au/pdf/whs/fatigue_management2005.pdf)
- Harel, A., Issacharoff, A., & Pfeffer, (2010, May 31). Israel navy commandos: Gaza flotilla activists tried to lynch us. Haaretz.com. Retrieved 18 June 2010, from <http://www.haaretz.com/news/diplomacy-defense/israel-navy-commandos-gaza-flotilla-activists-tried-to-lynch-us-1.293089>

- Haynes, L. (2007). A comparison between the Navy standard workweek and the actual work and rest patterns of U.S. Navy Sailors. Master's thesis, Operations Research department Naval Postgraduate School, Monterey, CA.
- Hinkle, J & Glover, T. (2004). Reduced Manning in DDG 51 Class Warship: Challenges, Opportunities and the Way Ahead for Reduced Manning on all United States Navy Ships. Arlington: Anteon Corporation.
- Irving, J. (1972). *Victims of groupthink*. Boston, MA: Houghton Mifflin.
- Jernigan, M. J. (1997). Marine Doom. *Marine Corps Gazette*, 81(8), 19. Retrieved 03 January 2010 from <http://proquest.umi.com/pqdweb?did=13428788&Fmt=7&clientId=65345&RQT=309&VName=PQD>
- Macedonia, M. (2005). *Ender's game redux [computer games]*.
- Mullin, P., & Bartee, J. (2002). Put a swat team on every ship. *United States Naval Institute.Proceedings*, 128(12), 30.
- Naval Tactical Training Publication (NTTP) 3-07.11. (2003). Maritime Interception Operations.
- Olson, M. (2004). *Actions of the USS Thunderbolt Crew (in USS Firebolt) during the 24 April 2004 attacks on Iraqi oil platforms in the Northern Arabian Gulf*. Retrieved 18 June 2010, from <http://www.history.navy.mil/shiphist/f/pc-10/2004.pdf>
- OPNAV INSTRUCTION 1000.16K. (2007). Navy total force manpower policies procedures.
- OPNAV INSTRUCTION 3500.39B. (2004). Operational Risk Management (ORM).
- Peterson, R., & Bass, C. (2005, February). *Impact injury and the high speed craft acquisition process*. Paper presented at the RINA Conference, Human Factors in Ship Design Safety and Operation, London, UK.
- Riddell, R. (1997, April). Doom goes to war. *Wired*, 5.
- Russell, J. (2006). The Littoral Combat Ship: Is the US Navy assuming too much risk? (Master's thesis, Military Art and Science department) US Army Command and General Staff College, Fort Leavenworth, KS.
- U.S. Department of Homeland Security – Federal Law Enforcement Training Center. (2010). U.S. Coast Guard Maritime Law Enforcement Academy Charleston training programs. Available from Federal Law Enforcement Training Center website, <http://fletc.gov>

- U.S. Department of Homeland Security – United States Coast Guard. (2010). Coast Guard Law Enforcement Detachments (LEDETs): A History. Available from United States Coast Guard website, [http://www.uscg.mil/history/articles/LEDET\\_History.asp](http://www.uscg.mil/history/articles/LEDET_History.asp)
- U.S. Marine Corps–Public Affairs. (2010). Indoor Simulator Marksmanship Trainer-Enhanced. Retrieved 25 June 2010 from <http://www.okinawa.usmc.mil/public%20affairs%20info/Archive%20News%20Pages/2007/070622-expo.html>
- Wickens, C., Lee, J., Liu, Y., & Becker, S. (2004). *An introduction to human factors engineering*. Pearson Prentice Hall, Upper Saddle River, N.J.
- Yates, W. (2004). A training transfer study of the indoor simulated marksmanship trainer. Master's thesis, Modeling, Virtual Environments and Simulation department, Naval Postgraduate School, Monterey, CA.
- UK sailors captured at gunpoint. (2007, March 23). *BBC News*. Retrieved 18 June 2010 from [http://news.bbc.co.uk/2/hi/uk\\_news/6484279.stm](http://news.bbc.co.uk/2/hi/uk_news/6484279.stm)

THIS PAGE INTENTIONALLY LEFT BLANK

## INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center  
Ft. Belvoir, Virginia
2. Dudley Knox Library  
Naval Postgraduate School  
Monterey, California
3. Navy Expeditionary Combat Command  
Virginia Beach, Virginia
4. Center for Security Forces  
Virginia Beach, Virginia
5. Jeffrey Kline  
Naval Postgraduate School  
Monterey, California